WATERING FACILITY

(No.)

Code 614

Natural Resources Conservation Service
Conservation Practice Standard

I. Definition

A device (tank, trough, or other watertight container) for providing animal access to water.

II. Purposes

To provide watering facilities for livestock and/or wildlife at selected locations in order to:

- Protect and enhance vegetative cover through proper distribution of grazing; or
- Provide erosion control through better pasture management; or
- Protect streams, ponds, and water supplies from contamination by providing alternative access to water.

III. Conditions Where Practice Applies

This practice applies to all land uses where there is a need for new or improved watering facilities to permit the desired level of pasture management, to reduce health hazards for livestock, or to reduce livestock waste in streams.

IV. Federal, State, and Local Laws

Users of this standard should be aware of potentially applicable federal, state, and local laws, rules, regulations, or permit requirements governing watering facilities. This standard does not contain the text of federal, state, or local laws.

V. Criteria

The following criteria apply to all purposes.

A. Capacity

The trough or tank shall have adequate capacity to meet the water requirements of the livestock and/or wildlife. The rate at which livestock drink and their watering habits must be assessed in order to provide adequate tank capacity. The facility shall have a capacity to provide at least the gallons per head per day listed in Table 1.

When animals come to drink as a group, a rapid water recharge rate, a large tank, or a combination of the two shall be provided to handle the sudden drawdown.

Livestock that intensively graze or are less than 900 feet from water will travel to water individually. The tank shall be large enough to allow 2 to 4 percent of the herd to drink at one time. A water supply flow rate that delivers the total daily herd needs in 4 hours or less with the use of full flow valves shall be provided.

Livestock that are managed in continuous grazing systems with large paddocks or are greater than 900 feet from water will travel to water in groups. The tank shall hold a minimum of one-quarter of the daily herd water requirement. The tank shall also be large enough to allow 5 to 10 percent of the herd to drink at one time.

Provisions shall be made to provide an alternate water source where water supply, pipeline, power, or pump failure could cause loss of supplied water.

B. Protection

When used during long periods of below-freezing temperatures, the trough or tank and outlet pipes shall be protected from freezing and ice damage. Freeze-proof troughs or electric heaters may be used.

System valves or pipes shall be protected by shields, covers, or located in an inaccessible area such as under an electric wire to prevent damage by livestock.

Automatic water level control and/or overflow facilities shall be provided as appropriate.

Overflow facilities shall be installed on all watering facilities where inflow is not controlled by automatic flow control switches or valves or where malfunction of automatic flow controls may cause saturated soil conditions or erosion.

Overflows shall be piped to a stable or suitable point of release to prevent erosion or hazardous conditions at the overflow outlet. The overflow outlets shall be protected from damage with rock, steel pipe, concrete, or other durable material. The overflow shall extend a minimum of 20 feet beyond the tank.

The overflow pipe shall be a minimum of 1/2 inch larger than the inflow pipe or 2 inches, whichever is larger.

Storage tanks shall be designed to withstand all anticipated internal and external loadings.

Roofs can be constructed to provide shade and reduce loss of water by evaporation.

When a roof is placed over the trough or tank to provide shade, the roof shall be designed for snow and wind loads as specified in ASAE EP 288.5 (Designing Buildings to Resist Snow and Wind Loads) and shall be durable to withstand anticipated livestock and wildlife activities.

C. Drinking Watering Facilities

All components of the watering facility system shall have appropriate protective structures installed that will protect them from damage by livestock, vandals, farm operations, or other site-specific hazards.

Water delivery systems shall be in accordance with the criteria contained in the appropriate Wisconsin Field Office Technical Guide (FOTG), Section IV practice standard.

1. Permanent Tanks

   Tank or trough bottoms shall be placed on rock, fine gravel, or sand. Where these materials are not present, the bottom shall be placed on a minimum 4-inch layer of fine gravel or sand.

   The site shall be well drained, or drainage measures shall be provided.

   Areas adjacent to the trough or tank that will be used by livestock shall be graveled, paved, or otherwise treated to provide firm footing and reduce erosion. This surface shall be extended to a minimum of 6 feet beyond the trough or tank. Design of the protective surface around the watering facility shall be in accordance with NRCS FOTG, Practice Standard 561, Heavy Use Area Protection.

2. Portable Tanks

   Tanks shall be placed on a level, grass-covered site out of areas of concentrated runoff and away from animal traffic areas such as gates. Tanks shall not be unstable or easily knocked over to prevent floats from remaining open and allowing large discharges of water. Tanks should be moved to new paddocks when the animals are moved. Tanks should be placed next to or slightly under electric fences to prevent animals from knocking over tanks or stepping on pipelines supplying water to the tank.

D. Materials

All materials shall have a life expectancy that meets or exceeds the planned useful life of the facility installation.

1. Lightweight Materials

   Lightweight troughs or tanks made of fiberglass, plastic, wood, or steel may be moveable or permanent installations. They shall meet the industry standards for the material being used.

2. Concrete

   Concrete tanks or troughs shall be constructed from a concrete mix producing a minimum compressive strength of 3,000 psi at 28 days. Concrete construction shall be in accordance with Wisconsin Construction Specification 4, Concrete.

   Acceptance of pre-cast components shall be based on an engineering analysis provided by the supplier. If placement requirements are an integral part of the design, then placement specifications shall be required.

3. Steel

   All steel tank material shall be galvanized, stainless steel, or factory coated with plastic or epoxy in a manner suitable for use in high exposure conditions.

   Top edges of tanks shall be reinforced with rolled pipe, galvanized tube angle iron, or

other suitable reinforcement. Top edge reinforcement is not required for corrugated steel, 12 gauge or heavier.

Tanks with steel bottoms shall be minimum 24 gauge for less than 6 feet diameter, and 20 gauge for larger diameters. The bottom shall be joined in such a manner as to provide a locked and water tight seam.

Where the trough or tank steel rim and concrete floor join, a heavy coating of a non-conductor of electricity such as asphalt or similar coating shall protect the metal rim.

4. Fiberglass

Fiberglass tanks or troughs shall have a nominal minimum thickness of 3/16 inch.

Fiberglass structures shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight.

Fiberglass for use in tanks with concrete bottoms shall have a minimum nominal thickness of 1/4 inch.

The tank top edge shall be flanged reinforced by a 2 inch straight flange, minimum of 3/8 inch thick or 2 inch curled or rolled flange, minimum of 1/4 inch thick.

5. Plastic

Plastic tanks or troughs shall be made of HDPE or equivalent materials.

Plastic structures shall be made of ultraviolet-resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight.

Table 1
Minimum Daily Livestock Water Requirements

Livestock	Drinking Water Quantity [1] (gals/head)		Maximum Water Spacing (miles)	
	Continuous/ Low Management Grazing System	**Prescribed/ Managed Grazing System**	**Rough Relief** [2] (strongly sloping, rolling, moderately steep, and hilly; generally > 15% slope)	**Gentle Relief** [2] (nearly level, gently sloping, and undulating)
Beef Cow	20	15	0.5	1
Cow & Small Calf	20	15	0.5	1
Horses & Mules	20	15	0.5	1
Sheep & Goats	4	2	0.5	1
Dairy Cow	25	20	0.5	1
Hog	2			

[1] Daily water consumption for livestock classes not listed may be calculated at one gallon per day per 100 lbs. of body weight.

[2] In a prescribed grazing system, less distance should be used.

VI. Considerations

Additional recommendations relating to design that may enhance the use of, or avoid problems with, this practice but are not required to ensure its basic conservation functions are as follows.

A. Potential effects of installation and operation of the watering facility on cultural, historical, archeological, or scientific resources at or near the site need to be considered in planning.

B. Topography should be evaluated to minimize trail erosion and flooding erosion from tank overflow.

C. Watering facilities should be accessible to small animals. Escape ramps for birds and small animals should be installed.

D. If deep tanks are installed, it is important to place an animal barrier over or around the tank to prevent animals from falling in.

E. Above-ground tanks should be protected from animals entering them or equipment accidentally striking them. Welded pipe barriers may be placed around tanks to protect them.

F. When the watering pipeline system enters through the bottom of the tank, an animal barrier should be installed to protect the pipeline appurtenances from damage.

G. When watering tanks are located on fence lines, wooden post and planking fence should be considered.

H. Tank floats for dairy herds should meet Grade A milk requirements for clearance from the water elevation and float to prevent back siphoning or a checkvalve installed in the line. Pipelines should have anti-siphon devices.

VII. Plans and Specifications

Plans and specifications for installing watering facilities shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the watering facility is a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

VIII. Operation and Maintenance

An Operation and Maintenance plan specific to the type of watering facility shall be provided to the landowner. The plan shall provide specific instructions for operating and maintaining the system to ensure that it functions properly. It shall also provide for periodic inspections and prompt repair or replacement of damaged components or erosion. The plan shall include, but not be limited to, the following provisions:

- Check for debris, algae, sludge, or other materials in the trough which may restrict the inflow or outflow system;
- Check for leaks and repair immediately, if any leaks are found;
- Check the automatic water level device to ensure proper operation;
- Check to ensure that adjacent areas are well protected against erosion;
- Check to ensure the outlet pipe is freely operating and not causing erosion problems; and
- Prepare guidance for winter weather, such as adding material in the storage area to allow for ice expansion without damage.

Algae and iron sludge accumulation should be addressed in areas with water quality that is known to cause problems. Chemicals such as copper sulfate and chlorine can be recommended as needed, as long as local rules and regulations are followed.

IX. References

USDA, NRCS, Wisconsin Field Office Technical Guide, Section IV, Conservation Practice Standards and Specifications.

Manual of Steel Construction, American Institute of Steel Construction.

Timber, National Design Specification for Wood, American Forest and Paper Association.

American Concrete Institute, ACI 318.